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## Notes on the Pteridophytes of Northwestern Ontario

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During the summer of 1914 the writer and his wife continued their botanical work of 1912 and 1913 in northwestern Ontario, going farther to the north and northwest of Lake Superior. In 1914 the uncompleted line of the Canadian Northern Railway was taken at Nipigon, riding in the caboose of a construction train forty miles north to the southeast extension of Lake Nipigon, a long narrow fiord-like arm known as Orient Bay.

Considerable time was spent in the Orient Bay region, and then, through the kindness of Chief Ranger L. E. Bliss, of the Nipigon Forest Reserve, to whom thankful acknowledgments are made for many courtesies extended, a trip was made by launch to the extreme northern end of the lake, about sixty-five miles farther north. Here camp was established at the Revillon Frères trading post, near the head of Ombabika Bay, about three weeks being spent there. Returning then by launch to Orient Bay and to Nipigon by construction and gravel train, a trip was made by way of the Grand Trunk Lines from Fort William to Graham, about two hundred miles to the northwest.

To the north of Lake Superior, around Lake Nipigon, it is wild in the extreme and very picturesque, but

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everything is on a grand scale. The region surrounding Lake Nipigon is included in the Nipigon Forest Reserve, about the size of the State of New Jersey, and the lake itself, forming as it does the uppermost one of the series of large Laurentian Lakes, ought to be called one of the Six Great Lakes. It is about forty-five by seventy-five miles in length and breadth, has many islands of all sizes and mainly very rocky in character, and the shores are steep and very irregular. The Lake Nipigon region has been covered in the far past by a flow of diabase (Keewenawan), which has formed a very rough topography, with mountains and gorges and everywhere cliffs three or four hundred feet high exhibiting palisade structure. This whole region is densely wooded, being an unbroken wilderness of bog and terrace, cliff and valley, the new railway lines affording the only land trails. At the extreme north end of Lake Nipigon the granite underlying the diabase comes to the surface and forms a more gently rolling, glaciated surface, in places extensively burned over. In this more northern region, however, were seen some of the best examples of a pure *Picea-Sphagnum* muskeag found anywhere during the three years.

The climate of the Lake Nipigon region is one of great extremes, occasional July and August temperatures reaching 90° F., while during the winter temperatures of between fifty and sixty below zero are not infrequent. There is practically no month of the year free from frost and the temperature of the surface six inches of Lake Nipigon in late August was found to be 59°. There is usually not much snow until late in the fall and the total for the year is probably not more than two feet. Potatoes will usually mature a fair crop in sheltered spots although usually more or less damaged by occasional nips of frost.

Around Graham, two hundred miles northwest of Fort William, the geological formations vary consider-

ably and the topography is not so rough as around Lake Nipigon. Viewed from the top of Sioux Lookout (a high knob near Graham), the general appearance is that of a gently rolling country with every hollow filled with some sort of a lake. There are in many cases merely "spillways" between the lakes, no stream channels having been there eroded. Along the Grand Trunk for one hundred miles to the southeast of Graham one can count on the average about one lake or pond for each mile traversed. The forest contains spruce muskeags, barrens of Banksian pine, mixed spruce-balsam-aspen-birch woods (especially on glacial soils and more level well drained areas), while around the lakes on rocky and gravelly slopes were formerly considerable forests of the red pine and some white pine.

In the following list of the pteridophytes collected during 1914, the same plan has been followed as for the lists of the 1912 and 1913 collections.\* As for the previous lists also, grateful acknowledgment is here made to Prof. L. S. Hopkins for the identification of the various specimens.

#### LYCOPODIALES

1. *Lycopodium lucidulum* Michx. Margin of rivulet on elevated upland, Orient Bay, L. Nipigon. This species was not found farther north at either Ombabika or Graham.

2. *Lycopodium annotinum* L. Forming a large part of the ground cover in *Pinus divaricata* woods around a little lake east of Virgin Falls, Lake Nipigon; near Ombabika Post and on low cliff along shore of north end of L. Nipigon; mixed woods, slope of Sioux Lookout Mt., Graham.

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\*Notes on the Pteridophytes of the north shore of Lake Superior. *Am. Fern Jour.* 3: 38-48. June, 1913, and, same title-II. *Ibid.* 4: 68-73. April-June, 1914.

3. *Lycopodium clavatum* L. In aspen-pine woods, Orient Bay; on ridge in spruce forest, Orient Bay; mixed woods, Graham.

4. *Lycopodium clavatum* var. *monostachyon* Grev. & Hook. Along C. N. R., about twenty miles north of Nipigon, at "Conmee"; mixed woods along trail, Graham.

5. *Lycopodium obscurum* var. *dendroideum* (Michx.) D. C. Eaton. Along top of ridge in spruce forest and along shore in mixed woods, Orient Bay, L. Nipigon; mixed woods along trail and on bare exposed top of Sioux Lookout Mt., Graham.

6. *Lycopodium complanatum* L. In *Populus tremuloides* woods and in *Pinus divaricata* woods, Orient Bay, L. Nipigon; and in mixed woods north of Graham.

7. *Lycopodium complanatum* var. *Wibbei* Haberer. In upland woods near Orient Bay. The range given for this form in Gray's *Manual* is "N. Vt. and centr. N. Y."

8. *Selaginella rupestris* (L.) Spring. On glaciated diabase shore of Livingston Pt., n. e. L. Nipigon; along shore of Pelican Lake and on bare top of Sioux Lookout Mt., Graham.

9. *Isoetes Braunii* Dur. On gravel bottom, 2 feet of water midway of east shore of Orient Bay, Lake Nipigon. This is the only *Isoetes* reported so far for the three seasons of collecting in northwest Ontario, although some specimens were collected in a quiet shallow place in the river at Nipigon in 1912. These specimens have been misplaced among the unidentified material somewhere, but they are probably of this same species.

#### EQUISETALES

10. *Equisetum arvense* var. *diffusum* A. A. E. Forms extensive and practically pure mats along the sandy

strand of a peninsula east side Orient Bay, L. Nipigon; along roadside Ombabika Post, north end L. Nipigon.

11. *Equisetum sylvaticum* var. *capillare* (Hoffm.) Milde. In deep spruce-balsam woods, Orient Bay, L. Nipigon; on half-bare burned-over granite land north of Ombabika Post, north end Lake Nipigon; on burned-over glacial till, Graham.

12. *Equisetum litorale* Kuhl. Along portage, mixed woods, North Ombabika Peninsula, north end L. Nipigon.

13. *Equisetum fluviatile* L. On sandy peninsula and forming part of the rush zone in shallow water along shore, east side Orient Bay, L. Nipigon; in very boggy *Picea-Sphagnum* woods at head of Ombabika Bay, north end of L. Nipigon.

14. *Equisetum hiemale* var. *intermedium* A. A. E. On open upper beach in front of *Populus tremuloides* woods east shore of Orient Bay, L. Nipigon.

15. *Equisetum hiemale* L. On sandy peninsula east side Orient Bay, L. Nipigon.

16. *Equisetum scirpoides* Michx. In *Picea-Sphagnum* woods at head of Ombabika Bay, L. Nipigon (muskeg); southwest shore of North Ombabika Peninsula, L. Nipigon; on ridge, in spruce woods, west side Orient Bay, L. Nipigon.

#### OPHIOGLOSSALES

17. *Botrychium neglectum* Wood. In *Populus tremuloides* woods, sandy peninsula, east side Orient Bay, L. Nipigon.

18. *Botrychium ternatum* var. *rutaefolium* (A. Br.) D. C. Eaton. In swampy place on low sandy peninsula and under *Populus tremuloides* woods, Orient Bay; along shore of Pelican Lake, and on west slope of Sioux Lookout Mt., Graham. This marks a still greater extension of range to the north and west of that reported in the 1912 collections.

19. *Botrychium virginianum* L. In mixed woods on slope of ridge and in *Populus tremuloides* woods on sandy peninsula, Orient Bay, L. Nipigon; *Fraxinus nigra* swamp at south end of Pelican Lake, Graham.

#### FILICALES

20. *Osmunda Claytoniana* L. Recent clearing along C. N. R. at Orient, L. Nipigon; along log road, Ombabika Post, north end of L. Nipigon; along trail in mixed woods, Graham.

21. *Polypodium vulgare* L. On rocks jutting out of muskeg, Conmee, 20 miles north of Nipigon; on diabase talus slope, Orient Bay, L. Nipigon; steep diabase cliff north end of L. Nipigon, Ombabika portage; slope of Sioux Lookout Mt., Graham. Of the last mentioned specimen Prof. L. S. Hopkins notes: "It is easy to see from these fronds why it is sometimes called 'Golden Polypody.'" One of the older, half-dead leaves looks almost as though gilded.

22. *Phegopteris Phegopteris* (L.) Underw. Spruce woods on top of ridge, and balsam-spruce slope woods, Orient Bay, L. Nipigon; south shore North Ombabika Peninsula, L. Nipigon; shore Pelican Lake, Graham.

23. *Phegopteris Dryopteris* (L.) Fée. On sandy peninsula, on diabase talus slope, and in spruce woods on top of ridge, Orient Bay, L. Nipigon; on glaciated granite, Ombabika Post, and on low diabase cliff southwest shore North Ombabika Peninsula, L. Nipigon; sheltered mossy bank, slope Sioux Lookout Mt., Graham.

24. *Pteridium aquilinum* (L.) Kuhn. In birch-spruce-poplar woods, Orient Bay, L. Nipigon; Sioux Lookout Mt., Graham.

25. *Athyrium filix-foemina* (L.) Roth. C. N. R. right-of-way, rocky bank of rivulet, and in spruce woods at top of ridge, Orient Bay, L. Nipigon; on glaciated

granite, Ombabika Post; and in mixed woods on diabase, North Ombabika Peninsula, L. Nipigon; mixed woods, Graham.

26. *Dryopteris fragrans* (L.) Schott. On diabase cliff east of Virgin Falls, on diabase talus slope east side Orient Bay, and on steep diabase cliff south shore North Ombabika Peninsula, L. Nipigon; in crevices on bare knob of Sioux Lookout Mt., Graham. Perhaps the most characteristic fern of the Lake Nipigon region—abounding on the numerous cliffs and talus slopes.

27. *Dryopteris cristata* (L.) Gray. Along mountain rivulet and in marshy *Myrica* bog, Orient Bay,

28. *Dryopteris intermedia* (Muhl.) Gray. Conmee, 20 miles north of Nipigon; damp woods, Virgin Falls, foot of L. Nipigon; wooded top of diabase hill, Sand Point, L. Nipigon; under *Alnus* along border of rivulet, Ombabika Post; mixed woods and in *Fraxinus nigra* swamp, s. end Pelican Lake, Graham.

29. *Filix fragilis* (L.) Underw. Crevices in high diabase cliff, Orient Bay, on rocks east of Virgin Falls, and on low diabase cliff s. w. shore North Ombabika Peninsula, Lake Nipigon; sheltered mossy bank, slope of Sioux Lookout Mt., Graham.

30. *Woodsia ilvensis* (L.) R. Br. Diabase cliff, east of Virgin Falls, on diabase talus slope, Orient Bay, and on rocks along shore of N. Ombabika Peninsula, L. Nipigon; bald top of Sioux Lookout Mt., Graham.

31. *Onoclea sensibilis* L. Along C. N. R. right-of-way, Orient Bay, L. Nipigon. Not seen farther north.

32. *Matteucia Struthiopteris* (L.) Todaro. Bottom of deep narrow gorge, Orient Bay, Lake Nipigon.

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